High Performance Computing and Communication

What is requested?

Climate modeling research uses numerical models of air and ocean systems to assess the sensitivity of these systems to changes in solar radiation, atmospheric and oceanic conditions, and trace substances. Ultimately, this research leads to better predictions of climate variations through the improved reliability of coupled ocean-atmosphere models. After a highly competitive procurement, NOAA awarded a three-year contract to Raytheon Company in FY2000 for the installation of a balanced high performance computer system at NOAA's Geophysical Fluid Dynamics Laboratory (GFDL) in Princeton, NJ. In FY2002 new funding of $2.993 million is needed in order to provide the computing power needed to meet GFDL's scientific goals.

Why do we need it?

For over 40 years GFDL has been one of the leading laboratories in the world in using supercomputers and advanced numerical models to better understand the meteorology and oceanography of the planet. GFDL scientists developed the first global models of the ocean and atmosphere and the first ocean-atmosphere climate model. Today's premier weather forecasting center, the European Center for Medium Range Forecasting, used GFDL models to get started. The technology required to make the successful El Niño forecasts at the National Centers for Environmental Prediction, in the National Weather Service (NWS), was developed at GFDL. The current operational hurricane forecast model used by both NWS and the Navy was developed at GFDL. Since GFDL's pioneering studies in modeling the causes for global warming, coupled models have become the primary modeling tool for predicting climate behavior on time scales from months to centuries. The ocean model developed at GFDL is used by a large fraction of the research community world-wide for ocean and seasonal forecasting studies.

What will we do with it?

The increase of $2.993M will result in a total program level of $14.3M, the amount needed to provide GFDL with the required computing capabilities. The computer will be used full-time to address some of the most difficult but critical obstacles to developing new and more realistic models for predicting climate variability, detecting climate change, and forecasting hurricanes. The computer will be used to improve the accuracy and timeliness of NOAA's short-term weather warnings, seasonal forecasts, and regional and global climate predictions. Without the additional funding, the government will be unable to meet its financial obligations under the Raytheon contract and GFDL's research programs will encounter further delays.

What are the benefits?

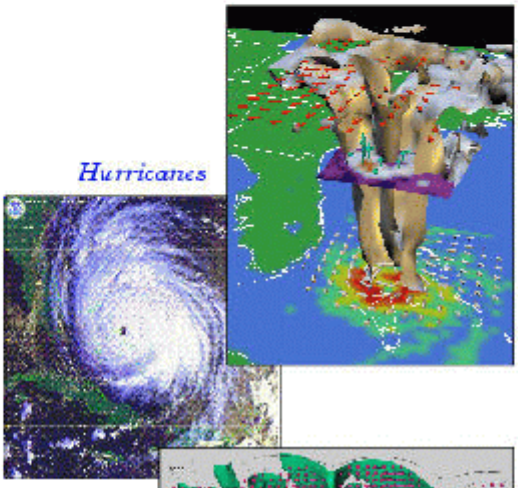
The increase for the GFDL supercomputer will ensure timely delivery of improved hurricane and seasonal forecast modeling capabilities to the NWS and will provide the best possible information to the nation regarding climate variability and change. Full funding will result in delivery of improved El Niño forecast models to the NWS; implementation of a "new way of doing business" in community modeling standards for massively parallel computers allowing easier, more effective collaborations between modelers within universities, other agencies, and NOAA; improved capability for research into hurricane forecast models; and effective development of the next-generation climate models required to understand how long-term climate change impacts the United States.

NOAA Budget

	FY2002 Change $ millions
Oceanic & Atmospheric Research	
Procurement, Acquisition & Construction	
HPCC/GFDL High Performance Computing	$ 2.993

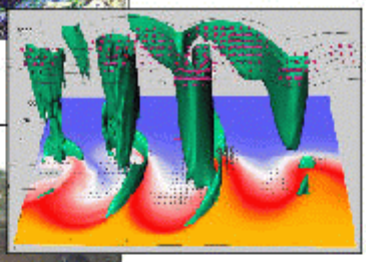
NOAA RESEARCH
Geophysical Fluid Dynamics Laboratory

GFDL Supercomputer Support



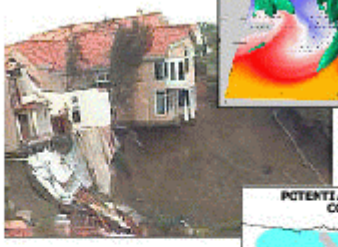
Development of Improved Hurricane Forecasts

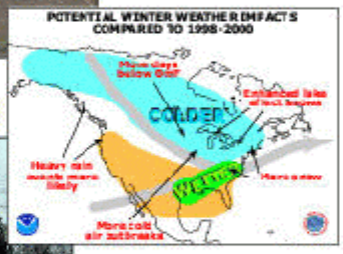
Hurricanes



Understanding Links Between Climate and Weather Extremes

El Niño Storms





Predicting Climate Variability and Change

NWS Seasonal Forecasts

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